REMARKS/ARGUMENTS

Applicant acknowledges receipt of the Office Action dated July 25, 2006. A total of 28 claims (Claims 1-4, 6-13, 15-18, 20-23 & 25-32) are pending and are currently under examination of which Claim 1 and 16 are independent claims. The Office Action is summarized as follows:

- Claims 1-15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 3,956,188 (hereinafter *Hindin*) in view of U.S. Patent No. 6,221,280 (hereinafter *Anumakonda*) and further in view of U.S. Patent No. 4,331,451 (hereinafter *Isogaya*); and
- Claims 1, 2, 5-11 and 16-28 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,447,745 (hereinafter *Feeley*) in view of *Anumakonda* and further in view of *Hindin*.

Applicant was unclear as the status of Claims 29-32. The summary of the Office Action seemed to indicate that these claims were rejected, but there is no basis for such rejection on the Detailed Office Action. A phone call to the Examiner was placed by the undersigned on October 25, 2006 to get the basis on which these claims were rejected. The Examiner clarified the rejections on such claims over the phone. Claims 29-30 dependent from Claim 1 were rejected as being obvious over *Hindin* in view of *Anumakonda* and *Isogaya* and further as being obvious over *Feeley* in view of *Anumakonda* and *Hindin*. Claims 31-32 dependent from Claim 16 were rejected as being obvious over *Feeley* in view of *Anumakonda* and *Hindin*.

Applicants would like to take this opportunity to thank the Examiner for his time and effort expended to examine the present application and especially for providing a straight forward and concise explanation of the bases of rejection. Applicants will endeavor to be equally clear and straight forward pointing out the distinctions between the invention and the prior art and how those distinctions have been properly captured in the Claims as now presented.

However, if the Examiner believes that Applicant has disclosed patentable subject matter, but has not properly captured the same by clear and concise claim language but such claim language is readily apparent to the Examiner, Applicant would greatly appreciate any and all additional help that the Examiner is able to provide. Please call the undersigned at the phone number provided so that this Application may be processed for prompt allowance.

I. Status of the Claims

By this reply, Claims 1, 4, 6, 9, 16, 18, 20 and 27 are currently amended, and such amendment to these claims do not constitute new matter and are supported by the application as filed.

The amendment of Claim 1 incorporates the limitations of original Claim 4 into the body of such claim. The amendment of Claim 16 incorporates the limitations of original Claim 18 into the body of such claim. Amended Claims 1 and 16 will be discussed below in the following Sections II and III.

Claims 4 and 18 are amended to narrow the metal surface area in the catalyst to be greater than 0.8 m^2 of metal per gram of catalyst. These amendments are supported by the specification as filed (see paragraph [0036] on Page 8). This amendment does not require additional search from the Examiner since a metal surface area greater than 0.35 m^2 of metal per gram of catalyst was already searched previously by the examiner in the examination of the original Claims 4 and 18.

Claims 6, 9, 20 and 27 were amended to perfect the Markush groups in a proper form. These amendments do not alter the intended scope, nor do they require the examiner to do additional searches.

A total of 28 claims (Claims 1-4, 6-13, 15-16, 18, 20-23, 25-32) are currently pending, in which:

- Claim 1 is an independent claim from which Claims 2-4, 6-13, 15 and 29-30 depend; and
- Claim 16 is an independent claim from which Claims 17, 18, 20-23, 25-28 and 31-32 depend.

II. Rejection under 35 U.S.C. § 103(a) over *Hindin* in view of *Anumakonda* and *Isogaya*

Claims 1-15 and 29-30 were rejected as being obvious over *Hindin* in view of *Anumakonda* and *Isogaya*.

Claims 5 and 14 were previously canceled by Applicant in the last Response dated May 8, 2006; so their rejection appears to be an error. Applicant will then address the rejection of Claims 1-4, 6-13, 15 and 29-30 over such combination of references.

In this reply, Claim 1 was amended to include the limitation of original Claim 4 which recites that the catalyst has a metal surface area greater than 0.35 square meter (m^2) of metal per gram of catalyst. This amendment is supported by at least original Claim 4 which is dependent from

Claim 1. Thus, *such amendment to Claim 1 would not require the Examiner to do another search and does not constitute new matter.*

In view of the current claim amendment to Claim 1, the rejection on Claims 1-4, 6-13, 15 and 29-30 is respectfully traversed for lack of *prima facie*. As stated in the previous response, the combination of *Hindin* with *Anumakonda* and *Isogaya* fails to teach or suggest all of the element recited in the rejected claims. Namely, none of the three references (*Hindin, Anumakonda, Isogaya)* teaches a metal surface area greater than 0.35 square meter of metal per gram of catalyst.

The references *Anumakonda, Isogaya* do not teach nor suggest any metal surface area. Moreover, they do not suggest that a minimum metal surface area is required in their catalyst.

Hindin discloses that the catalytically-active composite material has a surface area greater than 20 m^2/g (see *Hindin* Col. 1 lines 40-48). However, in view of the disclosure in *Hindin* Col. 2 lines 61-66 (in which alumina content in the composite has an impact on the surface area), the surface area disclosed in *Hindin* appears to represent what is commonly known in the art of heterogeneous catalysis as a 'BET surface area'. A BET surface area is determined by the method of Brunauer, Emmet and Teller on a model of adsorption, which commonly uses nitrogen as the adsorptive. Such method is disclosed in Applicant's specification in paragraph [0080] on Page 19 of the specification.

In Applicant's claimed process of Claim 1, the metal surface area is measured by a different method which utilizes chemisorption. Applicant's metal surface area is determined by chemisorption. A chemisorption method employing H_2 as a probe molecule is disclosed in Applicant's specification in paragraph [0095] on Pages 23-24 of the specification. Chemisorption is generally used to determine for example the percent metal dispersion, active metal surface area, size of active particles and/or surface acidity of catalyst materials. Chemisorption is the interaction of an active gas and a solid surface, involving the sharing of electrons between the adsorptive molecule and the surface. As such, since only the active metal phase responds to the chemisorbate (hydrogen in the present case), one can measure the active surface area and metal dispersion independently of the support or inactive components. The metal surface area of the catalyst is thus defined by Applicant as the surface area of active metal. Applicant disclosed the use of Micromeritics® instruments for both methods of surface area measurement, so Applicant has provided the Examiner with the manufacturer's physisorption determination methods (which is available at

http://www.azom.com/details.asp?ArticleID=3226# Surface_Area). See the attached Exhibit at the end of this response on Page 15-18.

To illustrate the difference between these surface areas of a catalyst composition, Applicant points to catalyst example 2 in Applicant's specification, for which the BET surface area is 71 m^2/g (see Table 1 on page 20) while the metal surface area is 1.5 m^2 of metal per gram of catalyst (see Table 2 on page 25). Additionally, Applicant has shown that a given metal content in catalyst compositions does not necessarily set the metal surface area of the same compositions. Indeed, the same catalyst compositions of catalyst Examples 2 and 3 (which were calcined at 1100 °C and 1200°C respectively) provided about 3-fold difference in the resulting metal surface areas in these catalyst examples (see Table 2 in Applicant's specification).

A metal surface area in a catalyst is impacted by many factors, such as fro example method of preparation, available BET surface area of the support if the metal is supported, calcination temperatures, composition of the metal or metals, and metal loading, (as evidenced in Table 2 of the present Application). As a result, providing a metal loading and/or calcination temperature is not sufficient to be able to predict the metal surface area. At best, given a loaded metal on a catalyst, one can predict the worst case in which the loaded metal is not dispersed (one single metal lump) and the best case in which the loaded metal is all dispersed (i.e., all of the metal is dispersed in a plurality of single metal atoms). The obtainable metal surface area lies between these two extremes. Moreover, there still is no guidance to an artisan from the combinations of these three references towards a minimum metal surface area in the catalyst of 0.35 m^2 of metal per gram of catalyst when the catalytically active metal is selected from the group consisting of Group VIII metals and rhenium.

Additionally, none of the three references (*Hindin, Anumakonda, Isogaya)* teaches a loss in hydrocarbon conversion no greater than about 3% per day in the production of synthesis gas.. Moreover, Applicant fails to see the suggestion from the combination of *Hindin* with *Anumakonda* and *Isogaya* to achieve a loss in hydrocarbon conversion no greater than about 3% per day. The Examiner has not provided an evidenciary support for such suggestion from the combination of *Hindin* with *Anumakonda* and *Isogaya* in the Office Actions dated July 25 and February 8, 2006. Applicant saw none. As evidence to a motivation to combine, the Office Action dated July 25, 2006 states on Pages 5-6 that the different catalyst compositions of *Hindin* are combined for the reason

that all three references teach the oxidation of hydrocarbons. However, a common objective does not necessarily mean equivalent, interchangeable or combinable means for obtaining such objective. Applicant contends that the disclosed processes differ in underlying chemistry. *Hindin* discloses a high temperature oxidation of carbonaceous fuels, particularly a catalytically-supported thermal combustion of carbonaceous fuels with oxygen which results in the formation of carbon dioxide and water. See *Hindin Col 17 lines 56-63. Anumakonda discloses a catalytic partial oxidation* process in which a "heavy hydrocarbon fuel" is partially oxidized by a catalytic reaction occurring at a temperature of no less than about 1050°C, with the catalytic partial oxidation process producing to be essentially converted to hydrogen and carbon monoxide. see *Anumakonda* Abstract. *Isogaya* discloses a catalytic two-bed gasification process for heavy oil of a specific gravity of higher than 0.7 characterized in that higher hydrocarbons are converted into lower hydrocarbons such as CH_4, C_2H_4 and C_3H_6 in addition to H_2, CO, CO_2 and H_2O in the presence of the first catalyst bed in the upper part of the reaction zone and then the cracking and gasification of the hydrocarbons are completed in the second catalyst bed in the lower part of the reaction zone. *Isogaya Abstract & Col 6 lines 55-68.*

Anumakonda was used by the Examiner for its teaching of synthesis gas production via oxidation of hydrocarbons, and *Isogaya* was used by the Examiner for its teaching of operating pressures of 2 atm or more, in a catalytic gasification process. But the three processes disclosed by *Hindin*, *Anumakonda* and *Isogaya* are clearly different in the type of chemical conversions that take place, and Applicant reiterates that an artisan having access to them would not be motivated to pick and choose from each disclosure to arrive to the present invention without a stronger motive to do so. An artisan could indeed try to use *Hindin*'s catalyst into *Anumakonda*'s partial oxidation process, albeit there would be no expectation from the artisan that CO and/or H_2 would be formed in this modified process, since *Hindin*'s catalyst has been disclosed to be effective for burning carbonaceous fuels into carbon dioxide and water. Such 'obvious-to-try' rationale is not proper without a suggestion of such combination from the art itself with a reasonable expectation of successful performance.

Furthermore, as explained in the previous response dated May 8, 2006, scientific principles strongly suggest that operation of catalytic partial oxidation of any light hydrocarbon(s) such as methane or natural gas at super-atmospheric pressures poses great challenges, one of the major ones being the unfavorable thermodynamics of the catalytic partial oxidation as the pressure goes up.

That is to say, since there is a net increase in the number of moles (in the same volume of gas) across the reaction, an increase in pressure will drive the equilibrium toward the reverse reaction and will result in decline in conversion and selectivities. Thus, at best one having ordinary skill in the art trying *Hindin*'s catalyst in the process of *Anumakondabu* under a pressure of 2 atm or more as taught in *Isogaya*'s gasification process would not have a reasonable expectation that the artisan would be successful in a catalytic partial oxidation process with such hydrocarbon conversion maximum loss as recited in Claim 1 and/or such selectivities and conversions at 2 atm or more as recited in Claims 12 and 13.

Applicant thus submits that the combination of *Hindin* with *Anumakonda* and *Isogaya* fails to teach or suggest each and every element recited in the rejected claims (as required by MPEP 2143.03); and that there is no suggestion nor motivation to combine such references to arrive to the present claimed process of Claims 1-4, 6-13 & 15 (as is required by MPEP section 2143.01).

Thus, Applicant submits that a *prima facie* case of obviousness was not put forth in such rejection, and further that Claim 1 as currently amended is patentable over the combination of *Hindin* with *Anumakonda* and *Isogaya*.

Since Claims 2-4, 6-13, 15 & 29-30 depends directly or indirectly from such patentable claim and carries with them all of the limitations of such claim, Applicant submits that Claims 2-4, 6-13, 15 & 29-30 are also patentable over such combination of references.

Thus, Applicant respectfully requests the withdrawal of the 103 rejection on Claims 1-4, 6-13, 15 & 29-30.

III. Rejection under 35 U.S.C. § 103(a) over *Feeley* in view of *Anumakonda* and *Hindin*

Claims 1, 2, 5-11 and 16-32 were rejected as being obvious over *Feeley* in view of *Anumakonda* and *Hindin*. Applicant respectfully traverses the Examiner's rejection, and submits that the Examiner has failed to make a *prima facie* case of obviousness in rejecting such claims.

Claims 5, 19 and 24 were previously canceled by Applicant in the last Response dated May 8, 2006; so their rejection appears to be an error. Applicant will then address the rejection of Claims 1, 2, 6-11, 16-18, 20-23, 25-28 and 29-32 over such combination of references.

In this reply, independent Claims 1 and 16 were amended to include the limitation of original Claims 4 and 18, which recites that the catalyst has a metal surface area greater than 0.35 square

meter (m^2) of metal per gram of catalyst. This amendment is supported by at least original Claims 4 and 18 which is dependent from Claim 1 and 16, respectively. Thus, *such amendment to Claims 1 and 16 would not require the Examiner to do another search and does not constitute new matter.*

In view of the current claim amendment to Claims 1 and 16, the rejection on Claims 1, 2, 6-11, 16-18, 20-23, 25-28 and 29-32 is respectfully traversed for lack of *prima facie*. Applicant submits that the combination of *Feely* with *Anumakonda* and *Hindin* fails to teach or suggest all of the element recited in the rejected claims (MPEP 2143.03). Namely, none of the three references (*Feeley, Anumakonda, Hindin)* teaches nor suggests a metal surface area greater than 0.35 square meter of metal per gram of catalyst. As stated above, *Anumakonda*, does not disclose any metal surface area for the catalyst and *Hindin* only teaches a BET surface area greater than 20 m^2/g, not a metal surface area which is measured by a different method. As stated on Page 12 in the Office Action dated July 25, 2006, the *Feeley* reference fails to disclose a metal surface area greater than 0.35 m^2 of metal per gram of catalyst.

Additionally, none of the three references (*Feeley, Anumakonda, Hindin)* teaches a loss in hydrocarbon conversion no greater than about 3% per day in the production of synthesis gas. Furthermore, Applicant fails to see any suggestion from the combination of *Feeley* with *Anumakonda* and *Hindin* to achieve a loss in hydrocarbon conversion no greater than about 3% per day. As stated on Page 12 in the Office Action dated July 25, 2006, the *Feeley* reference fails to disclose a loss in hydrocarbon conversion no greater than about 3% per day; however, in the Office Actions dated July 25 and February 8, 2006, the Examiner has not provided an evidenciary support for a suggestion of such combination of *Feeley* with *Anumakonda* and *Hindin* to arrive to the present claimed processes of Claims 1 and 16. Applicant sees none.

Thus, Applicant believes that a *prima facie* basis for obviousness has not been established for such claims as required by MPEP 2143.01 and 2143.03, and respectfully requests that the 103 rejection of Claims 1, 2, 6-11, 16-18, 20-23, 25-28 and 29-32 over the combination of *Feeley* with *Anumakonda* and *Hindin* be withdrawn.

IV. Conclusion

Applicant believes that they have fully responded to the Final Office Action dated July 25, 2006. Applicant submits that *no new matter was introduced* by way of amendment to the claims;

and that *the amendment does not raise new issues* that would require further consideration and/or search, since the pending independent Claims 1 and 16 carry the limitations of two original Claims 4 and 18, respectively, which were previously examined.

Applicant further submits that with the amendments and discussion of the distinguishing features of the present invention that all of the pending Claims in their current form are now allowable over the cited references. Applicant believes that what has been presented should be fully persuasive for allowability. Favorable action at the Examiner's earliest convenience is respectfully solicited.

Should there be any remaining issue which the Examiner believes would possibly be resolved by a conversation or should the Examiner would like to suggest critical language to put this application in condition for immediate allowance, the Examiner is invited to call the undersigned at (281) 293-4751 so that further delay in a Notice of Allowance can be avoided. Also, if the Examiner is not persuaded that the Application is in condition for allowance and further does not believe that whatever issues remaining can be resolved by a telephone interview, the Examiner is requested to at least approve entry of the amendments as they will clearly put this Application in better form for appeal by reducing issues for appeal.

Should any fees have been inadvertently omitted, or if any additional fees are required or have been overpaid, please appropriately charge or credit those fees to **Deposit Account Number 16-1575 of ConocoPhillips Company**, Houston, Texas, and consider this a petition for any necessary extension of time.

Respectfully submitted,

CONOCOPHILLIPS COMPANY- IP LEGAL

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